

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. **(currently amended)** In a vehicle differential including a housing having two spaced apart bearing seats that are aligned along an axis, a carrier in the housing generally between the bearing seats and having stub shafts which project into the bearing seats, and a beveled ring gear on the carrier; an improved bearing arrangement for supporting the carrier in the housing, said bearing arrangement comprising:

an internal ~~helix~~ thread in each bearing seat; and

a bearing located within each bearing seat and around the stub shaft that

projects into the seat to enable the carrier and ring gear to rotate in the housing about the axis, each bearing including an outer race having an outer raceway that is presented inwardly toward and is inclined with respect to the axis and an external ~~helix~~ thread that is coupled with the internal ~~helix~~ thread of the ring seat in which the bearing is located, each bearing also including an inner raceway located around the stub shaft that projects into the bearing seat for that bearing where it is presented outwardly toward the raceway of the outer race and is inclined in the same direction as the outer raceway for the outer race, each bearing further including rolling elements located between and contacting the outer and

inner raceways, the raceways of the one bearing being inclined in a direction opposite from the direction in which the raceways of the other bearing are inclined, so that the bearings confine the carrier axially in the housing, whereby the setting of the bearings and the position of the ring gear along the axis can be adjusted by rotating the outer races in their respective bearing seats.

2. **(original)** The combination according to claim 1 wherein each bearing further includes a locking ring attached to its outer race and engaged with the housing such that it and the outer race to which it is attached cannot rotate in the bearing seat for the bearing.

3. **(original)** The combination according to claim 1 wherein the raceways for each bearing are inclined downwardly away from the carrier, whereby the bearings are directly mounted.

4. **(currently amended)** The combination according to claim 1 wherein the outer race of each bearing also has a cylindrical surface located adjacent to the external ~~helix~~ thread on that race and likewise presented outwardly away from the axis.

5. **(currently amended)** The combination according to claim 4 wherein the external ~~helix~~ thread is at the end of the outer race where the raceway for the outer race

has its smaller diameter and the cylindrical surface is at the end where the raceway has its larger diameter.

6. **(currently amended)** The combination according to claim 4 ~~wherein the~~  
~~wherein the helices engage internal and external threads in the ring seats and on the~~  
~~outer races, respectively; and~~ wherein the crests of the external threads on the outer  
race project outwardly beyond the cylindrical surface of that race.

7. **(original)** The combination according to claim 6 wherein the cylindrical  
surface of each race lies along the internal threads of the bearing seat for the bearing of  
which that race is a part.

8. **(original)** The combination according to claim 7 wherein each outer race is  
located in its bearing seat with a loose fit, and the external thread on that race engages  
the internal thread of the bearing seat with a fit that is more loose than the fit between  
the cylindrical surface and the internal thread.

9. **(currently amended)** The combination according to claim 4 ~~wherein the~~  
~~helices are engaged with internal and external threads in the bearing seats and on the~~  
~~outer races, respectively; and~~ wherein each outer race is located in its bearing seat with  
a loose fit, and the external thread on that race engages the internal thread of the  
bearing seat with a fit that is more loose than the fit between the cylindrical surface and  
the bearing seat.

10. **(currently amended)** The combination according to claim 4 wherein the ~~helices are engaged with internal and external threads in the bearing seats and on the outer races, respectively,~~ each bearing seat includes a half bore and an initially separate cap that fits over the half bore, and the internal thread for the seat is in the half bore and in the cap.

11. **(original)** The combination according to claim 1 wherein each bearing further includes a ring which is attached to its outer race and has at least one formation which enables a tool to engage the ring, so that the tool can rotate the ring and the outer race.

12. **(original)** The combination according to claim 11 wherein each ring is attached to its outer race with pins which extend through the ring and are lodged in holes in the outer race.

13. **(original)** The combination according to claim 11 wherein each ring is attached to its outer race with a weld.

14. **(original)** The combination according to claim 11 wherein each ring is attached to its outer race with an adhesive.

15. **(original)** The combination according to claim 11 wherein each ring is attached to its outer race with screws which pass through the ring and thread into the outer race.

16. **(original)** In a differential for an automotive vehicle, which differential includes:

a housing having two spaced apart bearing seats that are aligned along an axis;

a carrier located in the housing generally between the bearing seats and having stub shafts which project into the bearing seats;

a beveled ring gear on the carrier; and

a single row tapered roller bearing supporting the carrier in the housing at each

of the stub shafts such that the carrier can rotate about the axis, but is confined axially, each bearing including a cup located in the bearing seat for its bearing and having a tapered raceway presented inwardly toward the axis, a cone located around the stub shaft that projects into the seat and having a tapered raceway that is presented outward away from the axis and toward the raceway of the outer race, and tapered rollers arranged in a single row between the cup and cone and contacting the raceways of the cup and cone; the bearings being mounted in opposition so that the raceways of the one bearing taper downwardly in one direction and the raceways of the other bearing taper downwardly in the opposite direction,

the improvement comprising:

an internal thread in each bearing seat, and  
an external thread on the cup of each bearing, with the external thread engaging  
the internal thread of the bearing seat in which the cup is located, whereby  
the setting of the bearings and the axial position of the ring gear can be  
adjusted by rotating the cups.

17. **(original)** The improvement according to claim 16 wherein the cup of each bearing also includes a cylindrical surface which is generally smooth and is located adjacent to the external thread for the cup where the cylindrical surface is also presented outwardly away from the axis.

18. **(original)** The improvement according to claim 17 wherein the cylindrical surface for each cup lies along the internal threads for the bearing seat in which the cup is located.

19. **(original)** The improvement according to claim 18 wherein each cup is located in its bearing seat with a loose fit, and the external thread of the cup engages the internal thread of the bearing seat with a fit that is more loose than the fit between the cylindrical surface and the internal thread.

20. **(original)** The improvement according to claim 17 wherein each cup is located in its bearing seat with a loose fit, and the external thread of the cup engages

the internal thread of the bearing seat with a fit that is more loose than the fit between the cylindrical surface and the bearing seat.

21. **(currently amended)** The improvement according to claim 17 wherein each cup fits into its ring seat with a loose fit in which the difference between the ~~diameters of~~ the pitch diameters for the external thread of the cup and the internal thread of the ring seat exceeds the difference between the diameter of the cylindrical surface and the surrounding surface of the bearing seat.

22. **(original)** The improvement according to claim 17 wherein the bearings are mounted with the large ends of the tapered rollers in the one bearing presented toward the large ends of the rollers in the other bearing and vice versa.

23. **(original)** The improvement according to claim 17, wherein each bearing seat includes a half bore in the housing and an initially separate cap located over the half bore, and the internal thread for the bearing seat is in the half bore and in the cap.

24. **(original)** The improvement according to claim 16 and further comprising a locking ring attached to each cup and being engagable with the housing to prevent the cup from rotating within the housing.

25. **(original)** The improvement according to claim 24 wherein the cup of each bearing has axially directed holes which open out of an end of the cup and the locking ring has pins which fit tightly into the holes.

26. **(original)** The improvement according to claim 23 wherein the locking ring is a metal stamping, has formations that are engageable by the tool, and is deformed into engagement with the housing.

27. **(currently amended)** The improvement according to claim 16 wherein the cup of each bearing has a back face at the small end of its raceway, with the back face being located at ~~substantiated~~ substantial angles with respect to the raceway of the cup and to the axis; and wherein each bearing further comprises a ring attached to its cup along the back face of the cup, the ring having at least one formation which enables a tool to engage the ring, so that the tool can rotate the ring and the cup.

28. **(original)** For use in a differential for an automotive vehicle, the combination comprising:

a cup having an axis and including an external thread, a raceway presented inwardly toward the axis, and a back face at the small end of the raceway, where it is located at substantial angles with respect to the raceway and the axis; and

a ring attached to the cup at the back face of the cup, the ring having formations which enable it to be engaged by a tool, so that the ring and the cup can be rotated by the tool.



29. **(original)** The combination according to claim 28 wherein the back face of the cup is perpendicular to the axis.

30. **(original)** The combination according to claim 28 wherein the ring is formed from a material which may be deformed into engagement with a housing, so that the ring and cup can be locked against rotation in the housing.

31. **(new)** A differential, comprising:

a differential carrier disposed about a first axis;

a differential case disposed within said differential carrier;

a bearing assembly disposed about said first axis between said differential carrier and said differential case, said bearing assembly allowing said differential case to rotate within said differential carrier

wherein said differential carrier includes a first plurality of threads disposed on a radially inner surface and said bearing assembly includes a cup having a second plurality of threads disposed on a radially outer surface configured to engage said first plurality of threads.

32. **(new)** The differential of claim 31, further comprising a deformable member coupled to said cup of said bearing assembly, at least a portion of said deformable member deformed and inserted into a slot in said differential carrier upon alignment of said bearing assembly within said differential carrier.

33. **(new)** The differential of claim 32, further comprising a plurality of fasteners coupling said deformable member to said cup of said bearing assembly.

34. **(new)** The differential of claim 33 wherein said deformable member is disposed about said first axis and said fasteners are equally angularly spaced about said deformable member.

35. **(new)** The differential of claim 33 wherein at least one of said plurality of fasteners comprises a pin.

36. **(new)** The differential of claim 32 wherein said deformable member is L-shaped in cross-section, having a first leg coupled to said cup of said bearing assembly and a second leg extending perpendicular to said first leg and away from said cup of said bearing assembly.

37. **(new)** A differential, comprising:

a differential carrier disposed about a first axis;

a differential case disposed within said differential carrier;

a bearing assembly disposed about said first axis and between said differential

carrier and said differential case, said bearing assembly allowing said

differential case to rotate within said differential carrier; and,

a deformable member coupled to a cup of said bearing assembly

wherein at least a portion of said deformable member is deformed and inserted

into a slot in said differential carrier upon alignment of said bearing assembly within said differential carrier.

38. **(new)** The differential of claim 37, further comprising a plurality of fasteners coupling said deformable member to said cup of said bearing assembly.

39. **(new)** The differential of claim 38 wherein said deformable member is disposed about said first axis and said fasteners are equally angularly spaced about said deformable member.

40. **(new)** The differential of claim 38 wherein at least one of said plurality of fasteners comprises a pin.

41. **(new)** The differential of claim 37 wherein said deformable member is L-shaped in cross-section, having a first leg coupled to said cup of said bearing assembly and a second leg extending perpendicular to said first leg and away from said cup of said bearing assembly.

42. **(new)** A method of assembling a differential, comprising the steps of:

providing a differential carrier and a differential case disposed within said

differential carrier, said differential carrier and said differential case disposed about a first axis and said differential carrier having a first plurality of threads on a radially inner surface;

inserting a bearing assembly between said differential carrier and said differential case, said bearing assembly including a cup having a second plurality of threads disposed on a radially outer surface and configured to engage said first plurality of threads; and,  
rotating said bearing assembly until a predetermined alignment position is reached.

43. **(new)** The method of 42, further comprising the steps of:  
affixing a deformable member to said cup of said bearing assembly;  
deforming at least a portion of said deformable member after reaching said predetermined alignment position; and,  
inserting said at least a portion of said deformable member into a slot in said differential carrier.

44. **(new)** The method of claim 43 wherein said rotating step includes the substeps of:

inserting a tool through an aperture in said deformable member; and,  
moving said tool until said bearing assembly reaches said predetermined alignment position.

45. **(new)** In a vehicle differential including a housing having two spaced apart bearing seats that are aligned along an axis, a carrier in the housing generally between

the bearing seats and having stub shafts which project into the bearing seats, and a beveled ring gear on the carrier; an improved bearing arrangement for supporting the carrier in the housing, said bearing arrangement comprising:

a bearing located within each bearing seat and around the stub shaft that

projects into the seat to enable the carrier and ring gear to rotate in the housing about the axis, each bearing including an outer race having an outer raceway that is presented inwardly toward and is inclined with respect to the axis, each bearing also including an inner raceway located around the stub shaft that projects into the bearing seat for that bearing where it is presented outwardly toward the raceway of the outer race and is inclined in the same direction as the outer raceway for the outer race, each bearing further including rolling elements located between and contacting the outer and inner raceways, the raceways of the one bearing being inclined in a direction opposite from the direction in which the raceways of the other bearing are inclined, so that the bearings confine the carrier axially in the housing,

at least one of the bearing seats having an internal thread and the outer race for

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the bearing in that bearing seat having an external thread that engages the internal thread, whereby the setting of the bearings can be adjusted by rotating the outer race having the external thread.